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SUPERSEDING
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30 October 1987

FEDERAL SPECIFICATION

CRANES, TRUCK-MOUNTED, TWO-ENGINE DRIVEN, LATTICE TYPE BOOM, DED

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This specification covers diesel engine driven, truck-mounted cranes capable of performing clamshell, dragline, and pile driving operations in addition to normal crane hoisting functions.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Commercial Item Description

A-A-52015 - Taglines, Crane, Spring-Loaded, Reel Type

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Beneficial comments (recommendations, additions, deletions) and any pertinent
*data which may be of use in improving this document should be addressed to: *
*Commanding Officer (Code 156), Naval Construction Battalion Center, *
*1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization *
*Document Improvement Proposal (DD Form 1426) appearing at the end of this *
*document or by letter. *
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Military Specifications

MIL-V-173 - Varnish, Moisture and Fungus Resistant (for Treatment of Communications, Electronics, and Associated Equipment)
MIL-T-704 - Treatment and Painting of Materiel
MIL-C-3580 - Cranes and Crane-Shovels, Truck, Crawler, and Wheel Mounted, Full-Revolving, and Their Attachments, Packaging of

Military Standard

MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment.

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Department of Transportation (DoT):

Federal Motor Carrier Safety Regulations

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

Environmental Protection Agency (EPA):

Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Certification and Test Procedures
Interstate Motor Carrier Noise Emission Standards
Motor Vehicle Air Pollution Standards
Title 40, CFR, Part 204 Subpart B - Noise Emission Standards for Construction Equipment

(Application for copies should be addressed to the Public Affairs Office, Environmental Protection Agency, Rockville, MD 20852; or CFR, Title 40 should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Copies of specifications, standards, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issue of the documents not listed in the DODISS shall be the issue of the non-Government document which is current on the date of the solicitation.

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American National Standards Institute (ANSI):

B30.5 - Mobile and Locomotive Cranes
Z53.1 - Marking Physical Hazards and Identification of Equipment

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

Society of Automotive Engineers (SAE):

SAE J159 - Load Moment System.
SAE J375 - Radius-of-Load or Boom Angle Indicating Systems.
SAE J376 - Load Indicating Devices in Lifting Crane Service.
SAE J534 - Lubrication Fittings, Standard.
SAE J589 - Turn Signal Switch, Standard.
SAE J987 - Rope Supported Lattice-Type Boom Crane Structures.
SAE J994 - Alarm-Backup-Electric-Performance, Test, and Application.

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

Tire and Rim Association, Inc. (TRA):

TRA Yearbook

(Application for copies should be addressed to the Tire and Rim Association, Inc., 175 Montrose West Avenue, Suite 150, Copley, OH 44321.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The truck-mounted crane shall consist of a revolving upperstructure, complete with crane boom and specified front-end attachments, mounted on a pneumatic, rubber-tired, heavy-duty, truck-type carrier. The truck-mounted crane, when delivered, shall be complete in all details for crane operations requiring: (a) the connection of upper, lower, and center boom section(s); (b) attaching base section to boom base; and (c) reeving primary (multiple part) and secondary (single part) hoist lines and attaching to drums. When front-end attachments for dragline, clamshell, and pile driving operations are specified (see 3.10), the conversion between any of the attachments and primary and secondary hoisting operations shall be accomplished by rereeving or the replacement of lines, and removal or replacement of drum lagging(s) for the intended uses, and attachment of lines at drums. The dragline fairlead may be

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boom- or deck-mounted, the clamshell tagline reel shall be boom-mounted, and all the front end and hoisting operations shall be satisfactorily accomplished without the removal of either. Those special tools that are unique to the crane and that are required for normal operation shall be furnished.

3.2 First article. When specified (see 6.2), the manufacturer shall furnish a crane for first article inspection and approval (see 4.3 and 6.3).

3.3 Material. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specified.

3.4 Standard commercial product. The crane shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer’s standard commercial product with any added features needed to comply with the requirements. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer’s standard commercial product shall be included in the crane being furnished. Standard commercial product is a product which has been sold or is currently being offered for sale on the commercial market through advertisements or manufacturer’s catalogs or brochures, and represents the latest production model.

3.5 Performance. The crane shall be capable of performing operational functions independently and simultaneously, including hoisting, swinging, booming, and traveling. The crane shall be capable of traveling over rough ground under adverse or severe conditions as may be encountered in normal commercial operations. When specified for LST-loading (see 6.2), cranes with basic butt section securely fastened in the boom rack and with the upper boom section removed shall be capable of being stowed aboard an LST with ramp in fully lowered position as indicated in figure 1. The crane design will allow for convenient disassembly into major components for rail, highway, and water transportation.

3.5.1 Lifting capacity. The crane shall have rated lifting capacities of not less than the loads specified (see 6.2), at the radii specified (see 6.2), with the boom length specified (see 6.2), with or without outriggers set as specified (see 6.2). The rated lifting capacities, without outriggers, shall be not less than 75 percent of the tipping loads; the rated lifting capacities, with outriggers, shall be not less than 85 percent of the tipping loads; and shall be within the family of lifting curves of the manufacturer’s published literature.

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3.5.2 Operational environments. The crane shall be capable of starting and maintaining constant performance characteristics (as specified) herein under any of the following conditions or combination of conditions:

a. Temperature conditions. In any temperature from -20 to +120 degrees Fahrenheit (oF) (-29 to +49o Celsius (C)).
b. Elevation conditions. At any elevation from sea level (barometric pressure 29.92 inches mercury (101.3 kPa)) and a maximum ambient temperature of 120oF (49oC) to 5,000 feet elevation and a maximum temperature of 107oF (42oC).

3.5.3 Operational power requirements. The crane shall be capable of simultaneously lifting and rotating a load equal in pounds (kilograms (kg)) to the maximum rated loads at designated radii as specified in 3.5.1. The completely equipped crane with basic boom shall be capable of traversing an off-highway grade of not less than 20 percent. The crane revolving upperstructure, completely equipped with basic crane boom and required accessories, shall be capable of rotation speed of not less than 2 revolutions per minute (rpm) for cranes with a maximum rating of 25 tons (22 680 metric tons (t)) or less, and not less than 2 rpm for cranes of over 25-ton (22 680 t) capacity. Cranes of 35-ton (31 751 t) capacity or less, completely equipped with basic boom and required accessories, shall be capable of attaining highway travel speeds of 40 miles per hour (mph) (64 kilometers per hour (km/h)) on a 1 percent grade. Cranes over 35 ton capacity, with necessary boom sections and accessories removed to meet highway weight limitations, shall be capable of attaining highway travel speeds of 35 mph (56 km/h), on a 1 percent grade.

3.5.3.1 Gradeability. The crane, without load and with mounted attachments, shall negotiate a 30 percent grade on paved road without engine stall. If a 30 percent grade is not available, a draw bar pull test may be substituted for travel up a 30 percent grade. The drawbar pull test shall simulate the downhill force resulting from the crane weight on a 30 degree grade. The crane shall pull with a force greater than the calculated downhill force without engine stall.

3.5.4 Backward stability. When tested in accordance with 4.3.6, the crane shall meet the following requirements:

a. With the longitudinal axis of the revolving upperstructure at 90o to the longitudinal axis of the carrier, the total load on all wheels on the side of the carrier under the boom shall be not less than 15 percent of the total working weight of the crane.
b. With the longitudinal axis of the revolving upperstructure in line with the longitudinal axis of the carrier, in either direction, the total load on all wheels under the lighter loaded end of the carrier shall be not less than 15 percent of the total working weight of the crane.

3.6 Construction. Where no specific construction requirements are specified herein, the manufacturer’s standard commercial practice shall apply. All parts, components, and attachments shall be identical for each type and capacity of crane furnished under any specific contract. No deviations will be accepted without prior written approval of the contracting officer.

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3.6.1 Crane structural stress requirements. Design of the completely assembled crane shall be such that the maximum stress imposed shall not exceed the minimum strength margins contained in SAE J987. Tests in accordance with SAE J987 shall have been performed on the model crane being provided and test results shall be made available for Government inspection at time of first article testing.

3.6.2 Maintainability. The crane design, together with component and accessory location and installation, shall permit ready accessibility to all items requiring periodic maintenance service in the field. Servicing will be accomplished with the use of conventional, general-purpose tools associated with equipment of this nature. The replacement and adjustment of components and accessories shall be accomplished with minimum drainage requirements and minimum disturbance to other elements of the crane.

3.6.3 Safety. All the safety provisions and regulations for operating the cranes shall be in accordance with ANSI B30.5. In addition, the crane shall comply with all Federal regulations governing equipment and personnel safety requirements in effect on the date of manufacture.

3.6.3.1 Strike hazard. The crane counterweight, boom point and hook block cheek plates shall be painted with black stripes applied to the basic crane yellow color. Stripes shall be 2 inches (50.8 millimeters (mm)) wide, with 2-inch (50.8 mm) spacing extending at a 45o angle, as per ANSI Z53.1.

3.6.3.2 Hook safety latch. A safety latch shall be provided on the crane hook to prevent the load from separating from the hook while hoisting or lowering is in progress.

3.6.3.3 Backup alarm. A backup alarm shall be provided on the crane and shall conform to SAE J994.

3.7 Revolving upperstructure. The upperstructure shall consist of a cab, enclosing the machinery and operator’s position, mounted on a revolving platform. When drums are not enclosed in the cab, provisions shall be made for weather protection of the clutches, brakes, and gears. Counterweights required for the truck-mounted crane shall be provided.

3.7.1 Cab. The cab shall be mounted on the revolving upperstructure, shall be fabricated from sheet steel or fiberglass, and shall have sufficient windows and glazed doors to permit at least 180o vision for the operator in the normal position. All glass shall be 1/4-inch (6.35 mm) nominal thickness, safety-type, and held in place by rubber or metal channels for easy replacement. Windows shall be arranged for easy opening and removal when required. All cab doors, whether of the sliding or swinging type, shall be adequately restrained from accidentally opening or closing when the crane is traveling or operating. All doors shall be provided with means for securely locking in the closed position. An adjustable and comfortable seat shall be provided in the cab. The seat shall be located for maximum unobstructed visibility by the operator and positioned so the operator may reach all control levers, pedals, and switches. When specified (see 6.2), the upperstructure cab shall contain a commercial type heater and defroster. The heater shall direct a steady flow of heated air to the operator’s feet and the defroster shall be capable of defrosting at least 75 percent of the front window area. The heater shall be mounted and positioned to

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permit routine maintenance and quick removal. A large heater, used as a combination heater and defroster, is acceptable. There shall be a powered window wiper, with control within operator's reach. When specified (see 6.2), there shall be a catwalk around the revolving upperstructure.

3.7.2 Gantry. A gantry, A-frame, or mast, of sufficient strength to withstand stresses induced by lifting the boom from the ground to operating position, shall be furnished. The gantry, A-frame, or mast shall be of the foldable, retractable, or lowering type without requiring the use of an outside power source, in order to reduce traveling or transport cube. The gantry crane shall be capable of lifting the maximum length of boom and jib as required.

3.7.3 Turntable.

3.7.3.1 Supporting rollers. The revolving upperstructure shall be supported by large, fixed rollers, rollers in pairs on tandem bogies, a live ball, or by a roller ring. The rollers shall be heat-treated steel and shall be accurately machined. Fixed rollers or rollers in pairs on tandem bogies shall be fitted with antifriction bearings or replaceable bronze bushings, and shall be provided with lubrication means. The balls or rollers shall be accessible and removeable.

3.7.3.2 Hook rollers. Where the holddown function is performed by hook rollers, the rollers may be of the dual-purpose type in which one set of rollers performs both the supporting and holddown functions, or may be of the holddown type only. Hook rollers may operate singly or in pairs on tandem bogies and shall be provided with grease fittings. When required by design, hook rollers shall be provided with vertical or horizontal adjustment.

3.7.4 Swing brake. A swing brake capable of holding the upperstructure in any desired position shall be provided. The swing brake control shall be located within reach of the operator while the operator is seated.

3.7.5 Swing controls. The rotation of the rotating frame shall be controlled through a hydraulic valving mechanism or through friction, hydrostatic or electromagnetic type clutches designed for fast cycling, craning and other operations. The hydraulic valving or clutch shall be capable of transmitting power exceeding that of the crane rated lifting loads or of the maximum governed engine torque. The operating temperature of the swing clutches shall not exceed the maximum temperature recommended by the clutch lining manufacturer. Clutches or hydraulic valving shall be controlled by either mechanical linkage, air, a manual effort applied through hydraulic linkage or by full-power hydraulics.

3.7.6 Drums. Pitch diameter of the drum or drum laggings shall be not less than 18 times the diameter of the largest rope used thereon. The drums shall have sufficient rope capacity to accommodate the specified rope lengths (see 3.12.2). Primary and secondary load hoist drums shall be provided. Power at the load hoist drum shall be not less than that required to meet lifting capacities specified at recommended reeving with rope of the length specified in 3.12.2 installed. Load brakes shall be capable of holding or smoothly lowering rated loads on recommended reeving, when properly adjusted. The brakes shall be capable of being locked in a set position. Drum clutches shall be capable of withstanding high-speed, continuous operation, as encountered in normal

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operation in commercial applications, without overheating or excessive wear. When specified (see 6.2), the crane shall be equipped with an auxiliary load hoist drum of adequate size for pile driving or jib boom hoistline operations. The auxiliary load hoist drum shall be powered either by the power plant or hydraulic power means and be independent from the boom hoist drum. The auxiliary drum shall be engaged by a friction type clutch or hydraulic control, and shall be operable through linkages and control lever from a position within reach of the operator while seated.

3.7.7 Power load lowering. The primary load hoist and the secondary load hoist drums shall be equipped with a powered reversing drive, and suitable control features to provide precision controlled power lowering of loads by the main hook line and secondary hook line. The drum brakes shall have a safety device that will automatically set the brake during loss of power. The powered load-lowering mechanism shall be actuated by a control conveniently located within the revolving upperstructure engine compartment, and shall be capable of lowering all rated loads with the manufacturer's recommended reeving. The powered load-lowering mechanism shall be capable of lowering the loads at a smooth, steady and variable, controlled rate of speed, without jerking, bouncing, or slipping the load. Extended use of the powered load-lowering mechanism shall not result in clutch or brake failure by fading, grabbing, cracking, internal rupture, breakage, permanent deformation, or any malfunction. Clutch and brake lining temperatures shall not exceed the maximum recommended by the manufacturer of the lining. The powered load-lowering mechanism shall be capable of being disengaged to allow load free-falling, when required, and also be capable of being disengaged, when not in use, so as not to interfere with normal crane operations. When specified (see 6.2), both the primary load hoist and the secondary load hoist shall be equipped with an automatic brake that will activate when the control lever for either primary or secondary hoist is returned to neutral. The automatic brake shall include an on-off feature to permit selection of the automatic brake mode or free-fall mode with manual brakes.

3.7.8 Boom hoist and power lowering. The crane boom hoist shall be power-controlled and shall raise the boom with capacity load. The boom hoist, equipped with a safety ratchet or other positive holding device, shall safely suspend the boom with recommended reeving without attention from the operator, shall provide for power lowering under the operator's control, and shall make gravity lowering (free spooling) of the boom cable impossible under any circumstance. The boom hoist and power lowering shall be controlled by a hydraulic valving system or clutches. The boom hoist clutch shall be of the friction or electromagnetic type, readily accessible for adjustment and repair, and sufficiently large to eliminate slippage under 115 percent of rated load. The hydraulic valving system or clutches shall be controlled by either mechanical linkage, air, manual effort applied through hydraulic linkage, or by full power hydraulics.

3.7.9 Controls. All crane controls, lockouts, and indicators shall be located within easy reach of the operator in the operator's cab, and shall be readily accessible under all conditions of operations. All controls shall be clearly marked as to their use and function. When specified (see 6.2), dual controls located in the upperstructure cab shall be provided to permit the crane operator to start and stop the carrier engine, operate the carrier brakes, clutch, steering, shifting the carrier transmission between the neutral,

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reverse, first speed gears, and control carrier engine speed. Such controls shall not interfere with the operation of the conventional carrier controls. These controls shall have been proven in actual service. The contractor shall make available descriptive literature, full information on, and evidence of prior use of the controls, upon request of the contracting officer.

3.7.10 Lighting and associated electrical system. The lighting system for the crane upperstructure shall be 12 or 24 volts (V). A heavy-duty alternator with a 65 ampere minimum rating shall be provided.

3.7.10.1 Floodlights. Two detachable floodlights shall be installed near the front and top of the cab, one on each side of the hoist line, and located in a position so that the lenses cannot be seen by the operator during normal operations. The floodlights shall be secured in brackets, capable of withstanding severe shock and vibration, and permit horizontal and vertical movement of the light beam and positive clamping of the light in any position. The floodlights shall not extend beyond the front or sides of the cab unless provision is made for an adjustable bracket to fold clear of the cab sides for transport. Floodlight sealed-beam units shall be of the 50-watt floodlamp type.

3.7.10.2 Interior lighting. The upperstructure cab shall have effectively located lighting to provide operating light, as well as adequate illumination for access to, and exit from, the cab, without window glare reflections.

3.7.10.3 Wiring harness. The electrical cable shall be plastic insulated, size No. 16 American Wire Gage (AWG) or larger. The harness shall be installed in conduit. Electrical connectors of the quick-disconnect type shall be provided. The circuits shall be color or number traced. Means to prevent chafing of the cable when passing through structural members shall be provided.

3.7.10.4 Circuits, circuit breakers, and switches. Lights shall be controlled by waterproof, single-pole, single throw, quick-make toggle switches of the commercial type, with automatic reset type circuit breakers or fuses. The switches shall be located on a panel within reach of the operator when seated. One switch and associated electrical circuit shall be provided for the independent control of the following light combinations:

a. Revolving upperstructure floodlights.
b. Interior cab lights.
c. Instrument lights.

3.7.11 Warning horn. A suitable warning horn, electric or air-operated, shall be mounted in a protected location on the exterior of the revolving upperstructure. The horn shall be operated by a control, of good commercial quality, mounted within reach of the operator.

3.8 Carrier. Unless otherwise specified (see 6.2), the crane carrier shall be the manufacturer’s standard width for the capacity crane furnished. The number of axles shall be the manufacturer’s standard for the capacity crane furnished. All axles under the revolving upperstructure shall be driven axles. The carrier shall be capable of supporting the revolving upperstructure. In addition, the carrier will support the specified front-end equipment with the operational rated load placed on the crane boom as it is rotated through the 180o range. The revolving upperstructure shall be positioned on the carrier in

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a single, fixed position providing maximum efficiency for general-purpose crane operations. The carrier shall be the conventional crane type, with half cab mounted on the left side over the front axle, and carrier engine mounted over or forward of the front axle. Carriers with dual front axles shall have independent rotation of outer and inner wheels to eliminate wheel drag and tire scuffing.

3.8.1 Powered outriggers. Hydraulically powered outriggers shall be provided and shall be capable of being set and retracted independently. The total setting time of the outriggers, in a normal setting position on level ground, shall not exceed 2-1/2 minutes. The outriggers shall have sufficient strength to provide full stability, under all loading conditions, including the ability to raise the crane off the ground from travel position when necessary to compensate for ground surfaces having irregular contours. When required by design, suitable warnings shall be conspicuously displayed instructing operating personnel as to the location and operation of lockout valves or similar devices employed for the purpose of shutting off oil supply. Hydraulic cylinders shall be enclosed within outrigger boxes except that vertical jack cylinders of outriggers, design for horizontal and vertical operation, shall be separately enclosed. Outrigger boxes extending beyond the overall tire width of the crane, with outriggers fully retracted, shall be demountable to permit maneuverability or for dragline operation. Suitable provisions shall be made for storing the floats when not in use. A device to accurately determine when the crane is level shall be installed in a position convenient to the outrigger controls. When specified (see 6.2), a front mounted outrigger shall be installed.

3.8.2 Tires and rims. The rims and tires provided as crane equipment shall all be the same size and shall conform to the recommendations to the TRA applicable to the operation and load. The tires shall be of the tube or tubeless type of the tire manufacturer’s first line grade. Each tire shall have load-carrying capacity sufficient for the loading imposed by the operation.

3.8.3 Carrier brake system.

3.8.3.1 Service brakes. Air-actuated service brakes complying with DoT Federal Motor Carrier Safety Regulations when applicable, shall be furnished. The service brakes shall be capable of controlling and holding the crane, with basic boom, on a 20 percent grade. On cranes of less than 35-ton (32 t) rated capacity, the service brakes shall be capable of stopping the crane within 40 feet (12 meters (m)) from a speed of 20 mph (32 km/h) on dry, hard, approximately level road surfaces, free from loose material, when tested in accordance with 4.3.10. On cranes of 35-ton (32 t) capacity or more, the service brakes shall be capable of stopping the crane within 50 feet (15 m) from a speed of 20 mph (32 km/h) when tested under the same conditions in accordance with 4.3.9.

3.8.3.2 Parking brake. The carrier shall be equipped with a heavy-duty, spring-set, air-release parking brake capable of holding the crane, without full load and with basic boom, facing either direction, on a 20 percent grade for at least 20 seconds without slippage, when tested in accordance with 4.3.9. A spring-loaded safety feature mechanism shall be provided for the locking of one or more axles in the event of air system failure.

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3.8.4 Steering. Cranes shall be equipped with hydraulic power-assisted steering.

3.8.5 Carrier controls. The carrier controls shall be similar to those furnished on standard commercial crane carriers. All controls shall be within reach of the operator, when in a sitting position, and shall be identified to indicate function and operation, when necessary.

3.8.6 Carrier lighting and associated electrical system. The carrier shall be equipped with headlamps, tail lamps, stoplamps, clearance and identification lamps, and reflectors conforming to DoT Federal Motor Carrier Safety Regulations, sections 393.12, 393.19, 393.20, 393.22 through 393.31, and 393.33 for 12V electrical system, and wiring as necessary to conform to the DoT Federal Motor Carrier Safety Regulations. Turn signal units conforming to SAE J589 shall be provided.

3.8.7 Carrier cab. The carrier cab shall be one-man half-cab, steel constructed, and commercially designed. The cab will be equipped with safety glass in the windshield and window. The door shall have vertically-opened glass with the right side window opening for cross-ventilation. Cab ventilation shall be provided for circulating air. The cab door shall be provided with a means for securely locking it in the closed position (with a door opening stop) to restrict the door from opening past 90o. Grab handles to aid the operator in mounting and dismounting shall be located on the exterior of the cab, alongside the door. An adjustable and comfortable seat for the operator, of a design corresponding to the seats furnished for commercial usage, shall be provided. When specified (see 6.2), a manufacturer’s standard hot water type heater and defroster shall be installed in the carrier cab. The heater shall conform to DoT Federal Motor Carrier Safety Regulations and shall be equipped with suitable means providing windshield defrosting. A powered windshield wiper shall be installed with control within reach of operator.

3.8.8 Carrier accessories. Carrier accessories required for conformance to the DoT Federal Motor Carrier Safety Regulations, including rearview mirrors of the West Coast type, shall be provided. In addition, towing hooks shall be provided on the front and rear members of the chassis frame.

3.9 Diesel engine. The diesel engine for the crane carrier and revolving upperstructure shall be standard commercial engines having horsepower, torque, and speed characteristics to satisfactorily meet all the crane performance requirements specified herein. The diesel engines shall start in any temperature above -20oF (-29oC). Starting aids may be either electric glow plug or ether pressure primer. When an ether priming system is furnished it shall be of the measured shot type with a storage capacity of not less than 12 fluid ounces. Each engine shall be furnished complete with at least the following:

a. An instrument panel complete with a lubricating oil pressure gage, a cooling liquid-temperature gage, a battery charge and discharge rate indicator, a tachometer (carrier engine only), and an hour meter.
b. Fuel tank with minimum capacity of 6 hours normal operation. If the tank is located in such a position that it must be walked on, it shall be covered with an anti-skid type material.
c. A 12V or 24V electric cranking system. Voltage for carrier and upperstructure starting systems will be the same.

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d. A battery or batteries. When specified (see 6.2), dry charged and sealed battery or batteries shall be furnished.
e. A charging alternator.
f. A cooling-liquid high temperature visible or audible safety device of the warning type.
g. A lubricating oil low pressure visible or audible safety device of the warning type.
h. An engine starting system shall be provided that allows the operator to start the engine when seated in the normal operating position.

3.9.1 Revolving upperstructure engine. In addition to the diesel engine requirements (see 3.9), the revolving upperstructure engine shall meet the requirements of 3.9.1.1 through 3.9.1.3.

3.9.1.1 Upperstructure power and speed rating. The upperstructure engine at full-load, governed speed, shall develop at the flywheel intermittent power exceeding the power required for the load hoist drum (see 3.7.6).

3.9.1.2 Upperstructure instruments and instrument panel. The manufacturer's standard illuminated instrument panel shall be provided and located in a position of easy visibility by the crane operator when seated at the controls. The instrumentation will be in accordance with 3.9.

3.9.1.3 Upperstructure engine torque converter. When specified (see 6.2), the revolving upperstructure engine shall be provided with single stage or three-stage hydraulic torque converter with a temperature indicating device. In lieu of an engine torque converter, the crane may be equipped with a variable displacement independent function control hydraulic system wherein each crane function has a dedicated pump. The system shall provide precise power load lowering in accordance with section 3.7.7.

3.9.2 Carrier engine. In addition to the requirements of 3.9, the carrier engine shall meet the requirements of 3.9.2.1 through 3.9.2.3.

3.9.2.1 Carrier power and speed rating. The carrier engine shall be of sufficient capacity to enable the crane to meet the requirements specified in 3.5.3.

3.9.2.2 Carrier instruments and instrument panel. The manufacturer's standard instrument panel, with illuminated instruments as specified in 3.9, shall be provided except that a speedometer with odometer shall be furnished in lieu of an hour meter.

3.9.2.3 Carrier engine hood. The carrier engine shall be housed under a substantial hood compatible with standard commercial practice.

3.10 Front-end operating equipment. Front-end operating equipment furnished shall be complete with all parts, including necessary wire rope. The following equipment, as specified (see 6.2), shall be furnished with each crane:

a. Crane boom.
b. Boom jib.
c. Crane hook block.
d. Swivel overhaul weight and hook.

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e. Drum laggings for crane operation.
f. Dragline fairlead and drum lagging for dragline operation.
g. Drum lagging for clamshell operation.

3.10.1 Crane boom. The crane boom shall include the boom, boom safety stop, boom angle indicator, and center section.

3.10.1.1 Booms. The boom length shall be in accordance with the length specified (see 6.2), and fabricated to conform to the manufacturer's best standard practice for the specific model crane involved. The basic boom shall be suitable for the insertion of center sections for the extension to the specified boom lengths. The length and number of boom center sections required shall be as specified (see 6.2). Boom sections shall be pin connected. The boom point shall have at least three parallel guarded sheaves. Sheaves shall be suitable for clamshell and dragline operations, and shall be not less than a five part line for hoisting operations. When specified (see 6.2), an anti-two blocking switch shall be provided on main and auxiliary lead hoist with audio-visual warning and function kick out.

3.10.1.2 Boom safety stop(s). A boom stop(s) shall be furnished in order to provide a safeguard against overtopping of the boom and shall be installed so as to limit the boom angle to not more than 85o above the horizontal plane. The boom stop(s) shall act as a shock absorber and shall allow the boom point to be lowered to the ground.

3.10.1.3 Boom hoist clutch throwout. Means shall be provided to disengage the clutch of boom hoist drums when the hoisting boom has reached the maximum angle or height and is in contact with boom stop(s).

3.10.1.4 Boom angle indicator. A boom angle indicator of the heavy pendulum type, swinging on bearings, shall be provided. The pointer shall indicate the angle of the boom with the horizontal plane and shall be clearly visible to the operator. A chart, located in the cab near the operator, shall be provided showing rated lifting capacities at various boom angles for various boom lengths, with a statement of deductions to be made when using jibs.

3.10.1.5 Tagline. The tagline shall conform to A-A-52015, for the applicable size of crane.

3.10.1.6 Boom rack. A boom rack shall be installed on the front end of the carrier frame to prevent the upperstructure from swinging during travel and to prevent damage to the carrier cab and engine compartment.

3.10.2 Boom jib. When specified (see 6.2), the boom jib shall be of the adjustable type, with jib riser and hold back ropes, and with single line overhaul ball and hook complete with necessary wire rope. The boom jib assembly shall be capable of lifting the manufacturer's recommended load to a maximum height. The length and number of boom jib extension sections required shall be as specified (see 6.2). When specified, boom jib shall be equipped with anti-two block switch.

3.10.3 Hook block. The rated capacity of the crane hook block shall be not less than the rated capacity of the crane for which it is furnished. The hook shall be of the forged steel, swivel type with an ultimate strength of

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four times the maximum safe-rated load and shall include a safety latch on the hook. The block and hook shall have adequate weight to insure payout of the cable without load on the hook in any position. Block assembly shall be provided for attachment to the hoist cable for not less than two-part reeving. Means shall be provided to secure hook block while traveling. The hook block furnished shall permit disassembly for visual and nondestructive testing. The hook shall not be painted.

3.10.4 Dragline fairlead. The dragline fairlead shall be of the four-sheave swinging or two-sheave and two-roller revolving type, and shall be mounted in accordance with the crane manufacturer's standard commercial practice. The fairlead shall have replaceable wear plates or replaceable guide rollers, and shall have bronze-bushed or antifriction, bearing-mounted sheaves with smooth cable grooves. The dragline fairlead shall be arranged to avoid chafing the drag cable in any working position. The dragline fairlead, when mounted in normal position for dragline operations, shall not interfere with crane lifting capabilities.

3.10.5 Load indicating and warning device. When specified (see 6.2), a load indicating device of the load-moment type shall be provided on primary to perform the following functions while on outriggers:

a. Provide a dial or digital reading of hook load in pounds.
b. Provide a dial or digital reading of radius in feet.
c. Provide a dial or digital reading of load-moment as a percentage of rated capacity.
d. Provide visual warning (amber light) when load-moment reaches 90 percent of rated capacity and visual and audible (red light and alarm) warning at 100 percent of rated capacity.
e. Provide function kickout when load moment exceeds 100 percent of rated capacity. When in the kickout mode, the operator shall retain control of the boom-up, boom-down and load-lowering function.

The device shall be capable of manually selecting: (1) parts of line; and (2) boom length. The device shall conform to SAE J159, J375, and J376.

3.10.6 Rated load capacities chart. The manufacturer's standard commercial load chart, which is provided to commercial customers, shall be furnished for the size crane specified. The load chart shall include capacities equal to or greater than those specified in 3.5.1. The chart shall be a permanent type, and shall be posted in the crane cab near the operator.

3.10.7 Swivel, weight and hook overhaul. The swivel, weight and hook furnished shall permit disassembly for overhaul and non-destructive testing.

3.11 Sheaves. The pitch diameter of the load hoist line sheaves shall be not less than 18 times the diameter of the largest rope used. The pitch diameter for load hoisting blocks shall be not less than 16 times the diameter of the largest rope used thereon. All other sheaves shall have pitch diameters of not less than 15 times the diameter of the largest rope used thereon. Flanges on the boom point sheaves shall extend the rope grooves not less than 1.75 times the diameter of the rope to be suitable for the operations of clamshell and dragline, and shall have a Brinell hardness of 229 to 325. All sheaves carrying hoisting lines shall be guarded to prevent the rope from

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leaving the sheave groove during operations. The sheave pins shall be of medium carbon or alloy steel, and shall be of sufficient size and strength to support the sheaves under maximum operating conditions. All sheaves shall be smooth and the nominal groove diameter shall not exceed the nominal diameter of the wire rope furnished by more than 1/16-inch. Sheaves shall not be made of a nonmetallic material.

3.12 Ropes. Wire rope shall, at a minimum, be improved plow steel, preformed, regular lay, and lubricated as required in Section 5. All live ropes arranged for running over sheaves, including the boom hoist cable, shall have a safety factor of not less than 3.5. All standing part or guy cables shall have a factor of safety not less than 3.

3.12.1 Rope sockets. Ends of standing ropes shall be secured by swaged or speltered socket type fittings. All other ropes shall have the manufacturer's standard commercial connection.

3.12.2 Rope lengths. Load-line wire rope shall be of sufficient length to permit performance of crane operations with the crane hook at ground level with the crane boom positioned at the minimum load radius as indicated in 3.5.1. The length shall also be based on a boom length 15 feet (4.58 m) greater than the actual boom length specified. The primary and secondary hoist drums shall be equipped with drum laggings with a rope capacity for not less than two boom lengths. The auxiliary drum rope lengths shall be two boom lengths plus at least 20 feet (6.1 m) extra (see 3.7.6). The boom hoist shall have sufficient rope to allow the tip of the boom to rest on level ground with three wraps of rope remaining on the boom hoist drum. In addition, pendant ropes shall be supplied for each center section of boom furnished.

3.12.3 Wire rope certification. The contractor shall provide a signed certification with each crane identifying the crane serial number, wire rope manufacturer, type of wire rope construction, type of wire rope material, and the minimum breaking strength of the wire rope provided.

3.13 Fungus resistance. When specified (see 6.2), electrical components and circuit elements, including terminal and circuit connections, shall be coated with varnish conforming to MIL-V-173 except that:

a. Components and elements inherently inert to fungi or in hermetically sealed enclosures need not be coated.
b. Current-carrying contact surfaces, such as relay contact points, shall not be coated.

3.14 Lubrication. Lubrication means shall be provided for all moving parts requiring lubrication. Lubrication fittings shall be in accordance with SAE J534, and shall be located in a protected position accessible to a hand gun. Pressure lubrication fittings shall not be used where normal lubricating pressure may damage grease seals or other parts.

3.15 Lifting and tiedown attachments. When specified (see 6.2), the crane shall be equipped with lifting and tiedown attachments. Lifting and tiedown attachments shall conform to MIL-STD-209, type III. Anti-rotation rods or a swing lock shall be provided for the crane to prevent free rotation of the revolving upperstructure during shipment. Attachments shall be indicated by a

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data plate, except tiedown attachments may be identified by stenciling or other suitable marking on the crane. Tiedown marking shall clearly indicate that the attachments are intended for tying down the crane on the carrier when shipped. Data plates shall be of a material which will be durable, corrosion resistant, and remain legible for the life of the equipment, and shall be mounted in a conspicuous location. The backing of the plate and the surface of which the plate is applied shall be made corrosion resistant by application of a paint or preservative compound.

3.16 Identification marking plate. A name plate will be furnished by the Navy for each unit. The contractor shall stamp all necessary data in the blank spaces provided for that purpose and securely affix it to each unit in a conspicuous place with brass screws or bolts of not less than 1/8 inch (3.18 mm) diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank. Point of contact for obtaining Navy name plates is: Commanding Officer, Naval Construction Battalion Center, Code 1533, 1000 23rd Avenue, Port Hueneme, CA 93043-4301.

3.17 Instruction and transportation plates. The crane shall be equipped with instruction plates suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the crane showing the center of gravity shall be provided on the transportation plate. Instruction and transportation shall be of a durable material and shall be securely affixed.

3.18 Cleaning, treatment, and painting. Unless otherwise specified herein, surfaces normally painted in good commercial practice shall be cleaned, treated, and painted as specified herein. When specified (see 6.2), the crane shall be cleaned, treated, and painted in accordance with MIL-T-704, type A. In either case, color of the finish coat shall be as specified (see 6.2). Metal surfaces to be painted shall be cleaned to insure that they are free from all oil, grease, welding slag and spatter, mill scale, products of corrosion, dirt, or other foreign substances. Painting shall consist of at least one coat of rust-inhibiting primer and one coat of finish enamel. The rust-inhibiting primer shall be applied to a clean, dry surface as soon as practicable after cleaning and treating. Painting shall be with manufacturer’s current materials according to manufacturer’s current processes. The total dry film thickness shall be not less than 2.5 mils (0.0635 mm). The paint shall be free from runs, sags, orange peel, or other defects.

3.19 Stenciling. The working weight of each crane shall be stenciled on each side of the crane in such a manner as to be readily discernible to personnel handling the crane. Prescribed tire pressure shall be indicated, on the carrier in locations near the wheels, by stenciling using block or stencil type letters approximately 1-inch (25.4 mm) high.

3.20 Tools and accessory storage. Means shall be provided to carry those tools and accessories required to maintain the crane. Toolbox(es) shall be the manufacturer’s standard made of sheet steel. The toolbox(es) shall have a

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hinged lid and means that will keep the lid closed when subject to vibration, and shall be securely fastened to the crane in a protected and accessible location.

3.21 Workmanship.

3.21.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.21.2 Bolted connections. Boltholes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.21.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet head, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

3.21.4 Welding. Welding procedures shall be in accordance with a nationally recognized welding code. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor’s overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.2 Examination. Each crane shall be examined for compliance with the requirements specified in Section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.2.1 First article inspection. First article inspection shall be performed on one crane when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.2 and the tests of 4.3. The first article may be a standard production item from the contractor's current inventory provided the crane meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining cranes to be furnished under the contract.

4.3 First article tests. When a first article is required, the crane shall be tested in accordance with 4.3.1 through 4.3.12. Failure of the crane to pass any test shall be the basis for rejection.

4.3.1 Test area. The test area shall be free of obstructions which may cause interference to raising the boom to its maximum height in any position of the rotating base, or interference to rotating the upperstructure with the boom in the horizontal position. The surface shall be sufficiently firm to allow passage of the crane without leaving tire tracks deeper than 1/4 inch (6.35 mm). A concrete or bituminous surface is desirable; and the test area shall be hard, and level within one percent in any direction for the following tests:

a. Break-in test.
b. Lifting capacity test.
c. Maneuverability test.
d. Backward stability test.
e. Gantry test.
f. Powered load-lowering test.
g. Service and parking brake test.
h. Swing brake test.
i. Crane hook test.
j. Lifting and tying down attachment test.
k. Production unit test.

4.3.2 Test crane.

a. The coolant, lubricating, and hydraulic systems shall be full and there shall be no excessive leakage.
b. Fuel tanks shall be maintained between full and half-full level throughout these tests. Check fuel gages for accuracy at empty, half-full, and full levels.

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c. Adjust tire pressure to conform to the crane manufacturer's recommendations. Tire gages shall be accurate to within +/-3 percent.
d. Adjust clutches and brakes in accordance with the manufacturer's instruction manual. Inspect to insure there is no dragging with the controls in the disengaged position. Carrier service brakes shall be capable of holding the crane in a stationary position.
e. Examine all cable anchors, sheaves, rollers, drive chains, rotating gears, rotating drums, and ropes to insure that there is no rubbing or interference.
f. The outriggers will not be in the down or supporting position.

4.3.3 Break-in test. Crane shall be operated with all systems and functions exercised for a period of not less than 4 hours total operating time. This test includes operating the gantry and boom. It will be accomplished with a partial load of not less than one-half of the rated capacity, with specified boom length at maximum radius and all adjustments set for the equipment to operate at maximum efficiency. Any major system or function failure will be cause for rejection.

4.3.4 Lifting capacity tests. The crane shall be completely serviced and subjected to the manufacturer's recommended break-in. The safe load capacity test shall be performed on level, paved surface by connecting calibrated weights to the lifting hook. The crane shall then lift an assortment of loads selected by the government quality assurance representative. Test loads shall be 118 percent of the manufacturer's rated loads taken from the load chart of the crane being tested. The crane shall be rotated 360o with each test load. A minimum of three shall be selected from the load chart to test structural integrity of the crane. A minimum of three loads shall be selected from the load chart for testing the stability of the crane.

4.3.5 Maneuverability test. The crane, equipped with basic boom, boom safety stop, boom angle indicator, tagline, hook block, and dragline fairlead, shall be given such tests as are necessary to determine conformance to the travel speeds and gradeability requirements as specified in 3.5.3, and that operating controls operate easily.

4.3.5.1 Road test. The crane shall be given a road test for not less than 10 miles (16.1 km) at a speed of 40 mph (64 km/h) over paved roads, 4 miles (6.43 km) over uneven roads with rough terrain at not less than 3 mph (4.8 km/h) and 1 mile (1.6 km) over unpaved surface comprised of loose and/or sandy soil.

4.3.6 Backward stability test. The crane shall be tested for weight distribution to insure proper backward stability while equipped with the shortest recommended boom set at minimum radius; with hook, hook block, and load handling equipment resting on the ground; and with outriggers retracted and free of the ground. Using platform scales accurate to within +/-1 percent of the observed vehicle weight, and with surrounding terrain level and of the same elevation as top of scales platform, measure the following:

a. Total weight. Check to see that the working weight is conspicuously stenciled on each side of the crane.

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b. Weight on the wheels on the right side, with the boom at right angles to the carrier, over the right side, and at minimum radius. Determine that this weight is not less than the specified minimum (see 3.5.4).
c. Weight on the wheels on the left side, with the boom at right angles to the carrier, over the left side, and at minimum radius. Determine that this weight is not less than the specified minimum (see 3.5.4).
d. Weight on the front wheels, with the boom on the carrier axis, over the front wheels, and at minimum radius. Determine that this weight is not less than the specified minimum (see 3.5.4).
e. Weight on the rear wheels, with the boom on the carrier axis, over the rear wheels, and at minimum radius. Determine that this weight is not less than the specified minimum (see 3.5.4).

4.3.7 Gantry test. The gantry shall be tested to insure conformance to 3.7.2.

4.3.8 Powered load-lowering test. General inspection of the power-down system shall be made for adequate lubrication, ease of operation of controls, safety precautions, and for good manufacturing practices. The powered load-lowering system shall be tested as follows to determine conformance to 3.7.7:

a. With the crane equipped with a boom of a length as specified (see 3.5.1) and with outriggers set, position the revolving upperstructure in the most stable craning position. Assemble a single line load equal to the maximum rated load divided by the recommended number of parts of hoist line reeving.
b. Position the boom angle for the minimum working radius.
c. Hoist the load 20 feet (6.1 m) above the ground level, +/-3 inches (76.2 mm), or until interference with the crane boom is imminent.
d. Prepare the crane for power-down operation on the main load line.
e. Operate the power load-lowering system in accordance with manufacturer's instructions and lower the load under power. Vary the speed of the load by varying the speed of the engine. Use of drum brake permissible to vary load speed.
f. When the load reaches the ground, immediately repeat operations (c), (d), and (e) until 20 cycles have been completed.
g. Check the temperatures of all linings employed in this operation with at least four thermocouples imbedded within each lining, near the working face, and uniformly spaced around the perimeter, or with a contact pyrometer placed directly on the lining.

4.3.9 Speed tests. Speed tests shall be taken over a 1 percent grade on a paved road. Maximum road speed shall be not less than 35 mph (56.3 km/h) for a distance of not less than 10 miles (16.1 km) (see 3.5.3).

4.3.9.1 Gradeability. The crane shall be tested for gradeability in compliance with 3.5.3.1. The crane, without load and with mounted attachments, shall negotiate a 30 percent grade on paved road without engine stall.

4.3.10 Service and parking brake tests. The crane, completely equipped with basic boom, lubricants, and cooling systems full, and fuel system at least half-full, shall be tested on a dry, hard, approximately level, hard surface,

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and on a road surface of 30 percent grade, free from loose material, to determine compliance with the specified service brake requirements (see 3.8.3.1). Not less than five successive stops shall be made. Parking brake test shall be conducted on a road surface of 20 percent grade to hold the crane, without full load, to determine compliance with 3.8.3.2.

4.3.11 Swing brake test. Test the swing brake at an engine speed of 600 rpm by engaging the brake with the upperstructure in several positions and attempt to rotate the upperstructure. A crane equipped with swing brakes shall have the mechanism engaged to determine conformance to these requirements. Check to insure that the upperstructure will remain stationary when the boom is positioned in the boom rack.

4.3.12 Crane hook test. The manufacturer shall furnish certification from the crane hook manufacturer that the hook furnished with the crane is of compatible size, having the proper load capacity and safety factor, without defects or discontinuities. If the certification is not furnished, the crane hook shall be tested as follows: the crane hook shall be given a wet or dry ferromagnetic particle test to determine surface or subsurface cracks or discontinuities. Either method of test used shall show clearly visible particles defining existing discontinuities. Any indication of crack or discontinuities shall be cause for rejection.

4.3.13 Lifting and tiedown attachment tests. A visual inspection and engineering calculations verifying that the lifting/tiedown attachments are in compliance with MIL-STD-209 will be acceptable.

4.4 Packaging inspection. The inspection of the preservation, packing, and marking shall be in accordance with the requirements of Section 4 of MIL-C-3580. The inspection shall consist of the quality conformance inspection and, when specified (see 6.2), a preproduction pack inspection shall be furnished for examination and test within the time frame required.

5. PACKAGING

5.1 Preservation, packaging, and marking. The preservation, packing, and marking shall be in accordance with MIL-C-3580 with the level of preservation and level of packing as specified (see 6.2).

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The truck-mounted cranes are primarily intended for use in material handling operations, including the lifting and transporting of loads for short distances. When equipped with the various front-end attachments specified, the truck-mounted cranes will be used for clamshell and dragline bucket operations and for pile driving.

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6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification
b. When specifications and standards are other than as specified (see 2.1.1)
c. When first article is required for inspection and approval (see 3.2, 4.2.1, 4.3, and 6.3)
d. When LST-loading is required (see 3.5)
e. Crane lifting capacities, with and without outriggers, of specific radii, and boom length required (see 3.5.1)
f. When a heater and defroster is required for the upperstructure cab (see 3.7.1)
g. When catwalk is required (see 3.7.1)
h. When an auxiliary load hoist drum is required (see 3.7.6)
i. When automatic brake is required for both primary and secondary load hoist (see 3.7.7)
j. When dual controls for operating carrier from revolving upperstructure cab are required (see 3.7.9)
k. When crane carrier width shall be other than manufacturer's standard (see 3.8)
l. When a front mounted outrigger is required (see 3.8.1)
m. When a heater and defroster for the carrier cab is required (see 3.8.7)
n. When dry charged and sealed battery or batteries are required (see 3.9)
o. When front mounted counterweight is specified (see 3.10)
p. When hydraulic torque converter is required (see 3.9.1.3)
q. Type of front-end operating equipment required (see 3.10)
r. Length and number of boom center sections required (see 3.10.1.1)
s. When an anti-two blocking switch is required (see 3.10.1.1)
t. When an adjustable type boom jib is required (see 3.10.2)
u. Length and number of extension sections of boom jib required (see 3.10.2)
v. When a load indicating and warning device is required (see 3.10.5)
w. When fungus resistance is required (see 3.13)
x. When lifting and tiedown attachments are required (see 3.15)
y. When cleaning, treatment, and painting is to conform to MIL-T-704 (see 3.18)
z. Color of finish coat required (see 3.18)
aa. When a preproduction pack is required and the time frame required for submission (see 4.4)
bb. Level of preservation and level of packing required (see 5.1)

6.3 First article. When a first article is required, it shall be tested and approved under the appropriate provisions of paragraph 7-104.55 of the DAR. The first article should be a first production item consisting of one complete crane or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The contracting officer should include specific instructions in all acquisition instruments regarding arrangement for examinations, test, and approval of the first article.

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6.4 Crane lifting capacity. The lifting capacity of the crane required should be stated at minimum and maximum working radius, as well as other intermediate radii with and without outriggers. The boom length is also required for each lifting capacity desired.

6.5 Supersession data. This specification replaces military specification MIL-C-22972E dated 30 October 1987.

MILITARY INTERESTS:

Custodians

Navy - YD1
Air Force - 99

Review Activities

Navy - MC
Air Force - 84

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD1

(Project 3810-0118)